RAD
data communications

Installation and Operation Manual

ASM-10/8

Short Range Modem

ASM-10/8

Short Range Modem
Installation and Operation Manual

Notice

This manual contains information that is proprietary to RAD Data Communications Ltd. ("RAD"). No part of this publication may be reproduced in any form whatsoever without prior written approval by RAD Data Communications.

Right, title and interest, all information, copyrights, patents, know-how, trade secrets and other intellectual property or other proprietary rights relating to this manual and to the ASM-10/8 and any software components contained therein are proprietary products of RAD protected under international copyright law and shall be and remain solely with RAD.

ASM-10/8 is a registered trademark of RAD. No right, license, or interest to such trademark is granted hereunder, and you agree that no such right, license, or interest shall be asserted by you with respect to such trademark.

You shall not copy, reverse compile or reverse assemble all or any portion of the Manual or the ASM-10/8. You are prohibited from, and shall not, directly or indirectly, develop, market, distribute, license, or sell any product that supports substantially similar functionality as the ASM-10/8, based on or derived in any way from the ASM-10/8. Your undertaking in this paragraph shall survive the termination of this Agreement.

This Agreement is effective upon your opening of the ASM-10/8 package and shall continue until terminated. RAD may terminate this Agreement upon the breach by you of any term hereof. Upon such termination by RAD, you agree to return to RAD the ASM-10/8 and all copies and portions thereof.

For further information contact RAD at the address below or contact your local distributor.

International Headquarters
RAD Data Communications Ltd.

24 Raoul Wallenberg St.
Tel Aviv 69719 Israel
Tel: 972-3-6458181
Fax: 972-3-6498250
E-mail: rad@rad.co.il

U.S. Headquarters
RAD Data Communications Inc.

900 Corporate Drive
Mahwah, NJ 07430 USA
Tel: (201) 529-1100, Toll free: 1-800-444-7234
Fax: (201) 529-5777
E-mail: market@radusa.com

© 1989–2002 RAD Data Communications Ltd. Publication No. 600-200-08/02

Limited Warranty

RAD warrants to DISTRIBUTOR that the hardware in the ASM-10/8 to be delivered hereunder shall be free of defects in material and workmanship under normal use and service for a period of twelve (12) months following the date of shipment to DISTRIBUTOR.

If, during the warranty period, any component part of the equipment becomes defective by reason of material or workmanship, and DISTRIBUTOR immediately notifies RAD of such defect, RAD shall have the option to choose the appropriate corrective action: a) supply a replacement part, or b) request return of equipment to its plant for repair, or c) perform necessary repair at the equipment's location. In the event that RAD requests the return of equipment, each party shall pay one-way shipping costs.

RAD shall be released from all obligations under its warranty in the event that the equipment has been subjected to misuse, neglect, accident or improper installation, or if repairs or modifications were made by persons other than RAD's own authorized service personnel, unless such repairs by others were made with the written consent of RAD.

The above warranty is in lieu of all other warranties, expressed or implied. There are no warranties which extend beyond the face hereof, including, but not limited to, warranties of merchantability and fitness for a particular purpose, and in no event shall RAD be liable for consequential damages.

RAD shall not be liable to any person for any special or indirect damages, including, but not limited to, lost profits from any cause whatsoever arising from or in any way connected with the manufacture, sale, handling, repair, maintenance or use of the ASM-10/8, and in no event shall RAD's liability exceed the purchase price of the ASM-10/8.

DISTRIBUTOR shall be responsible to its customers for any and all warranties which it makes relating to ASM-10/8 and for ensuring that replacements and other adjustments required in connection with the said warranties are satisfactory.

Software components in the ASM-10/8 are provided "as is" and without warranty of any kind. RAD disclaims all warranties including the implied warranties of merchantability and fitness for a particular purpose. RAD shall not be liable for any loss of use, interruption of business or indirect, special, incidental or consequential damages of any kind. In spite of the above RAD shall do its best to provide error-free software products and shall offer free Software updates during the warranty period under this Agreement.

RAD's cumulative liability to you or any other party for any loss or damages resulting from any claims, demands, or actions arising out of or relating to this Agreement and the ASM-10/8 shall not exceed the sum paid to RAD for the purchase of the ASM-10/8. In no event shall RAD be liable for any indirect, incidental, consequential, special, or exemplary damages or lost profits, even if RAD has been advised of the possibility of such damages.

This Agreement shall be construed and governed in accordance with the laws of the State of Israel.

General Safety Instructions

The following instructions serve as a general guide for the safe installation and operation of telecommunications products. Additional instructions, if applicable, are included inside the manual.

Safety Symbols

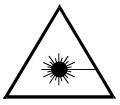
Warning

This symbol may appear on the equipment or in the text. It indicates potential safety hazards regarding product operation or maintenance to operator or service personnel.

Danger of electric shock! Avoid any contact with the marked surface while the product is energized or connected to outdoor telecommunication lines.

.

Protective earth: the marked lug or terminal should be connected to the building protective earth bus.



Warning

Some products may be equipped with a laser diode. In such cases, a label with the laser class and other warnings as applicable will be attached near the optical transmitter. The laser warning symbol may be also attached. Please observe the following precautions:

- **Before turning on the equipment, make sure that the fiber optic cable is intact and is connected to the transmitter.**
- **Do not attempt to adjust the laser drive current.**
- **Do not use broken or unterminated fiber-optic cables/connectors or look straight at the laser beam.**
- **The use of optical devices with the equipment will increase eye hazard.**
- **Use of controls, adjustments or performing procedures other than those specified herein, may result in hazardous radiation exposure.**

ATTENTION: The laser beam may be invisible!

Always observe standard safety precautions during installation, operation and maintenance of this product. Only qualified and authorized service personnel should carry out adjustment, maintenance or repairs to this product. No installation, adjustment, maintenance or repairs should be performed by either the operator or the user.

Handling Energized Products

General Safety Practices

Do not touch or tamper with the power supply when the power cord is connected. Line voltages may be present inside certain products even when the power switch (if installed) is in the OFF position or a fuse is blown. For DC-powered products, although the voltages levels are usually not hazardous, energy hazards may still exist.

Before working on equipment connected to power lines or telecommunication lines, remove jewelry or any other metallic object that may come into contact with energized parts.

Unless otherwise specified, all products are intended to be grounded during normal use. Grounding is provided by connecting the mains plug to a wall socket with a protective earth terminal. If an earth lug is provided on the product, it should be connected to the protective earth at all times, by a wire with a diameter of 18 AWG or wider. Rack-mounted equipment should be mounted only in earthed racks and cabinets.

Always make the ground connection first and disconnect it last. Do not connect telecommunication cables to ungrounded equipment. Make sure that all other cables are disconnected before disconnecting the ground.

Connection of AC Mains

Make sure that the electrical installation complies with local codes.

Always connect the AC plug to a wall socket with a protective ground.

The maximum permissible current capability of the branch distribution circuit that supplies power to the product is 16A. The circuit breaker in the building installation should have high breaking capacity and must operate at short-circuit current exceeding 35A.

Always connect the power cord first to the equipment and then to the wall socket. If a power switch is provided in the equipment, set it to the OFF position. If the power cord cannot be readily disconnected in case of emergency, make sure that a readily accessible circuit breaker or emergency switch is installed in the building installation.

Connection of DC Mains

Unless otherwise specified in the manual, the DC input to the equipment is floating in reference to the ground. Any single pole can be externally grounded.

Due to the high current capability of DC mains systems, care should be taken when connecting the DC supply to avoid short-circuits and fire hazards.

DC units should be installed in a restricted access area, i.e. an area where access is authorized only to qualified service and maintenance personnel.

Make sure that the DC supply is electrically isolated from any AC source and that the installation complies with the local codes.

The maximum permissible current capability of the branch distribution circuit that supplies power to the product is 16A. The circuit breaker in the building installation should have high breaking capacity and must operate at short-circuit current exceeding 35A.

Before connecting the DC supply wires, ensure that power is removed form the DC circuit. Locate the circuit breaker of the panel board that services the equipment and switch it to the OFF position. When connecting the DC supply wires, first connect the ground wire to the corresponding terminal, then the positive pole and last the negative pole. Switch the circuit breaker back to the ON position.

A readily accessible disconnect device that is suitably rated and approved should be incorporated in the building installation.

Connection of Data and Telecommunications Cables

Data and telecommunication interfaces are classified according to their safety status.

The following table lists the status of several standard interfaces. If the status of a given port differs from the standard one, a notice will be given in the manual.

Ports	Safety Status	
V.24	SELV	Safety Extra Low Voltage: Ports which do not present a safety hazard. Usually up to 30 VAC or 60 VDC.
Line	TNV-1	Telecommunication Network Voltage-1: Ports whose normal operating voltage is within the limits of SELV, on which overvoltages from telecommunications networks are possible.

Always connect a given port to a port of the same safety status. If in doubt, seek the assistance of a qualified safety engineer.

Always make sure that the equipment is grounded before connecting telecommunication cables. Do not disconnect the ground connection before disconnecting all telecommunications cables.

Some SELV and non-SELV circuits use the same connectors. Use caution when connecting cables. Extra caution should be exercised during thunderstorms.

When using shielded or coaxial cables, verify that there is a good ground connection at both ends. The earthing and bonding of the ground connections should comply with the local codes.

The telecommunication wiring in the building may be damaged or present a fire hazard in case of contact between exposed external wires and the AC power lines. In order to reduce the risk, there are restrictions on the diameter of wires in the telecom cables, between the equipment and the mating connectors.

Caution To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cords.

Attention Pour réduire les risques s'incendie, utiliser seulement des conducteurs de télécommunications 26 AWG ou de section supérieure.

Some ports are suitable for connection to intra-building or non-exposed wiring or cabling only. In such cases, a notice will be given in the installation instructions.

Do not attempt to tamper with any carrier-provided equipment or connection hardware.

Electromagnetic Compatibility (EMC)

The equipment is designed and approved to comply with the electromagnetic regulations of major regulatory bodies. The following instructions may enhance the performance of the equipment and will provide better protection against excessive emission and better immunity against disturbances.

A good earth connection is essential. When installing the equipment in a rack, make sure to remove all traces of paint from the mounting points. Use suitable lock-washers and torque. If an external grounding lug is provided, connect it to the earth bus using braided wire as short as possible.

The equipment is designed to comply with EMC requirements when connecting it with unshielded twisted pair (UTP) cables. However, the use of shielded wires is always recommended, especially for high-rate data. In some cases, when unshielded wires are used, ferrite cores should be installed on certain cables. In such cases, special instructions are provided in the manual.

Disconnect all wires which are not in permanent use, such as cables used for one-time configuration.

The compliance of the equipment with the regulations for conducted emission on the data lines is dependent on the cable quality. The emission is tested for UTP with 80 dB longitudinal conversion loss (LCL).

Unless otherwise specified or described in the manual, TNV-1 and TNV-3 ports provide secondary protection against surges on the data lines. Primary protectors should be provided in the building installation.

The equipment is designed to provide adequate protection against electro-static discharge (ESD). However, it is good working practice to use caution when connecting cables terminated with plastic connectors (without a grounded metal hood, such as flat cables) to sensitive data lines. Before connecting such cables, discharge yourself by touching earth ground or wear an ESD preventive wrist strap.

FCC-15 User Information

This equipment has been tested and found to comply with the limits of the Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the Installation and Operation manual, may cause harmful interference to the radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canadian Emission Requirements

This Class A digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulation.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Warning per EN 55022 (CISPR-22)

Warning	This is a class A product. In a domestic environment, this product may cause radio interference, in which case the user will be required to take adequate measures.
Avertissement	Cet appareil est un appareil de Classe A. Dans un environnement résidentiel, cet appareil peut provoquer des brouillages radioélectriques. Dans ces cas, il peut être demandé à l'utilisateur de prendre les mesures appropriées.
Achtung	Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkströrungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Declaration of Conformity

Manufacturer's Name: RAD Data Communications Ltd.

Manufacturer's Address: 24 Raoul Wallenberg St.
Tel Aviv 69719
Israel

declares that the product:

Product Name: ASM-10/8

conforms to the following standard(s) or other normative document(s):

EMC:	EN 55022 (1994)	Limits and methods of measurement of radio disturbance characteristics of information technology equipment.
	EN 50082-1 (1992)	Electromagnetic compatibility – Generic immunity standards for residential, commercial and light industry.
Safety:	EN 60950 (1992/93)	Safety of information technology equipment, including electrical business equipment.

Supplementary Information:

The product herewith complies with the requirements of the EMC Directive 89/336/EEC and the Low Voltage Directive 73/23/EEC. The product was tested in a typical configuration.

Tel Aviv, October 23rd, 1996

Haim Karshen
VP Quality

European Contact: RAD Data Communications GmbH, Otto-Hahn-Str. 28-30, 85521 Ottobrunn-Riemerling, Germany

Quick Start Guide

Installation of ASM-10/8 should be carried out only by an experienced technician. If you are familiar with ASM-10/8, use this quick start guide to set it up for operation.

This guide describes the standalone version of the modem.

Perform the installation procedures for both the local and the remote units.

1. Installing ASM-10/8

Set the ASM-10/8 internal jumpers and switches correctly for the chosen operating mode. Refer to the table below for the possible settings.

Warning

Make sure that the power cord is disconnected before removing the unit's cover.

Item	Jumper	Description	Values	Default Setting
1	SWITCH	Enables activation of DIG, ANA and REM loopbacks via the front-panel pushbuttons	**EN** – The loopbacks can be activated via the front panel **DIS** – The loopbacks cannot be activated via the front panel	EN
2	2W/4W	Selects 4-wire or 2-wire operation	**4W** – 4-wire operation **2W** – 2-wire operation	4W
***Note**: When using 2-wire operation, connect both wires to the XMT screws of the terminal.*				
3	AGC	Controls the AGC operation	**ON** – AGC is always active **CTRL** – ACG is active only when DCD turns on	ON
***Note**: When set to CTRL, ACG remains at its last level of amplification if DCD goes off.*				
4	CARRIER	Selects the transmit carrier mode.	**ON** – Transmit carrier is constantly On **CTRL** – Transmit carrier is On only if RTS is high	ON
***Note**: Set CARRIER to CTRL when using ASM-10/8 in multipoint applications.*				

Item	Jumper	Description	Values	Default Setting
5	XMT LEVEL	Selects the transmit output level to the line	**0 dbm**	0 dbm
			-3 dbm	
			-6 dbm	
			-9 dbm	
6	XMT IMPD	Selects transmit line impedance	**600**	
			300	
			150	150
			LOW	
***Note**: Set XMT IMPD to LOW when using ASM-10/8 in multipoint applications.*				
7	RPF	Enables the Remote Power Failure notification (ASM-10/8/R only)	**ON** – RPF notification enabled	ON
			OFF – RPF notification disabled	
***Note**: Set RPF to OFF when using ASM-10/8 in multipoint applications.*				
8	PIN 18	Controls the local analog loopback activation via the DTE pin 18	**EN** – The analog loopback activation from the DTE enabled	EN
			DIS – The analog loopback activation from the DTE disabled	
9	PIN 21	Controls the remote digital loopback activation via the DTE pin 21	**EN** – The remote loopback activation from the DTE enabled	EN
			DIS – The remote loopback activation from the DTE disabled	
10	CHAS GND	Controls the connection between the ASM-10/8 signal ground and the frame (chassis) ground	**CONN** – Signal ground is connected to the frame ground	CONN
			DIS – Signal ground is disconnected from the frame ground	
***Note**: Disconnecting the signal ground from the frame ground may render the unit unsafe for connection to unprotected telecommunication networks in some locations.*				
11	RCV IMPD	Selects receive line impedance	**150**	150
			300	
			600	
			HIGH	
***Note**: Set RCV IMPD to 150Ω for the master modem and the last modem in the line, and all others to HIGH, when using ASM-10/8 in multipoint applications.*				

Item	Jumper	Description	Values			Default Setting
12	CTS-DLY	Selects delay between RTS and CTS	**0 msec**			
			8 msec			8 msec
			64 msec			
13	Data Rate	Selects the data rate	**0 – 19.2**			
			1 – 14.4			
			2 – 9.6			9.6
			3 – 7.2			
			4 – 4.8			
			5 – 3.6			
			6 – 2.4			
			7 – 1.2			
14	XMT TIMING	Selects the transmit timing signal clock source	**INT CK** – Internal clock			INT CK
			EXT CK – External clock			
			RCV CK – Receive clock			
			ASYNC – Async mode			
15	DIP Switch	The DIP switch consists of four sections. The S1 section is reserved for future use.				
	S2	Selects the amount of stop bit shortening to be used in async mode.	**ON** – 25%			OFF
			OFF – 12.5%			
	S3, S4	Selects character length in async mode	**S3**	**S4**	**No of bits**	
			OFF	OFF	8 BIT	
			OFF	ON	9 BIT	
			ON	OFF	10 BIT	10 BIT
			ON	ON	11 BIT	

Connecting the Cables

Connecting the Line

➤ **To connect the line:**

- Connect the line cable to the terminal block connector on the ASM-10/8 rear panel.

Connecting the DTE

➤ **To connect the DTE:**

- Connect the DTE cable to the DB-25 female rear panel connector.

Connecting the Power

➤ **To connect AC power to ASM-10/8:**

1. Connect the power cable to the power connector on the ASM-10/8 rear panel.
2. Connect the power cable to the mains outlet.

   The unit turns on automatically upon connection to the mains.

➤ **To connect DC power to ASM-10/8:**

- Refer to *DC Power Supply Connection Supplement*.

2. Operating ASM-10/8

ASM-10/8 does not require operator attention once installed and configured.

Verifying Performance

When data is being transferred, observe that the following front panel LEDs light or blink:

- PWR: On
- RTS: On
- TD: Blinking or Off
- RD: Blinking or Off
- DCD: On
- TEST: Off.

Contents

Chapter 1. Introduction

1.1 Overview 1-1
- Versions 1-1
- Applications 1-1
- Features 1-3

1.2 Physical Description 1-5

1.3 Functional Description 1-6
- Encoder 1-6
- Modulation Timing 1-7
- Async to Sync Converter 1-7
- XMT Level and XMT Filter (Optional) 1-7
- Receiver 1-7
- Remote Power Failure (RPF) Indication 1-8
- V.54 Diagnostics 1-8

1.4 Technical Specifications 1-9

Chapter 2. Installation and Setup

2.1 Site Requirements and Prerequisites 2-1

2.2 Package Contents 2-1

2.3 Installation and Setup 2-2
- Setting the Internal Jumpers 2-2
- Configuration Considerations 2-6
- Connecting the Interfaces 2-7
- Connecting the Power 2-8

Chapter 3. Operation

3.1 Front Panel Controls and Indicators 3-1

3.2 Operating ASM-10/8 3-2
- Turning On ASM-10/8 3-2
- Normal Indications 3-3
- Turning Off ASM-10/8 3-3

Chapter 4. Diagnostics

4.1 V.54 Loopback Tests 4-1
- Local Analog Loopback (LLB) 4-2
- Remote Digital Loopback (RLB) 4-3
- Local Digital Loopback (DIG) 4-4

Chapter 5. ASM-10/8/R Card Version

5.1 ASM-MN-214 Card Cage 5-1
- Line Connector 5-1
- DB-25 DTE Connector 5-1

5.2 Power Supply 5-3
- AC Supply 5-3
- DC Supply 5-3
- Power Supply with Redundancy 5-3

5.3 ASM-10/8/R Front Panel 5-4
5.4 Installing the ASM-10/8/R Card 5-6
Setting Internal Jumpers and Switches 5-6
Installing ASM-10/8/R into the ASM-MN-214 Card Cage 5-6
Connecting the Interfaces 5-6

Appendix A. Connector Wiring

List of Figures

1-1. Point-to-Point Application 1-1
1-2. Multipoint Application 1-2
1-3. Tail-End Application for DDS Service 1-2
1-4. Star Application 1-3
1-5. ASM-10/8, 3D View 1-5
1-6. ASM-10/8 Block Diagram 1-6

2-1. ASM-10/8 PCB Layout 2-3
2-2. ASM-10/8 Rear Panel 2-7

3-1. ASM-10/8 Front Panel 3-1

4-1. Local Analog Loopback 4-2
4-2. Remote Digital Loopback 4-3
4-3. Local Digital Loopback 4-4

5-1. ASM-MN-214 Rear Panel 5-2
5-2. ASM-10/8/R Front Panel 5-4
5-3. ASM-MN-214 Front Panel 5-5

List of Tables

1-1. ASM-10/8 Transmission Ranges 1-4

2-1. ASM-10/8 Internal Jumpers and Switches 2-4
2-2. AGC and CTS Delay Settings for Short-Range Applications 2-6
2-3. AGC and CTS Delay Settings for Long-Range Applications 2-7
2-4. Async Character Length Settings 2-7

3-1. ASM-10/8 Front Panel Controls and Indicators 3-1
3-2. ASM-10/8 Indicator Status 3-3

Chapter 1
Introduction

1.1 Overview

ASM-10/8 is a short-range modem, which operates over unconditioned lines. It can function in full or half-duplex mode with synchronous or asynchronous transmission format. ASM-10/8 has an extended range of up to 28 km (17.4 miles) on 24 AWG wire, and more depending on wire gauge and data rate (see *Table 1-1*). It operates at eight selectable rates ranging from 1.2 kbps to 19.2 kbps.

Versions

The following versions of the modem available:

- ASM-10/8 standalone unit
- ASM-10/8/R, a plug-in card for installation in the ASM-MN-214 19-inch modem rack, holding up to 14 cards.

Power Supply

- AC – 115 VAC or 230 VAC
- DC – 18 to 60 VDC.

Applications

The following diagrams illustrate the ASM-10/8 in a variety of configurations:

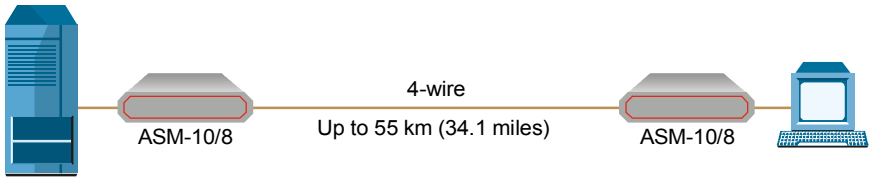


Figure 1-1. Point-to-Point Application

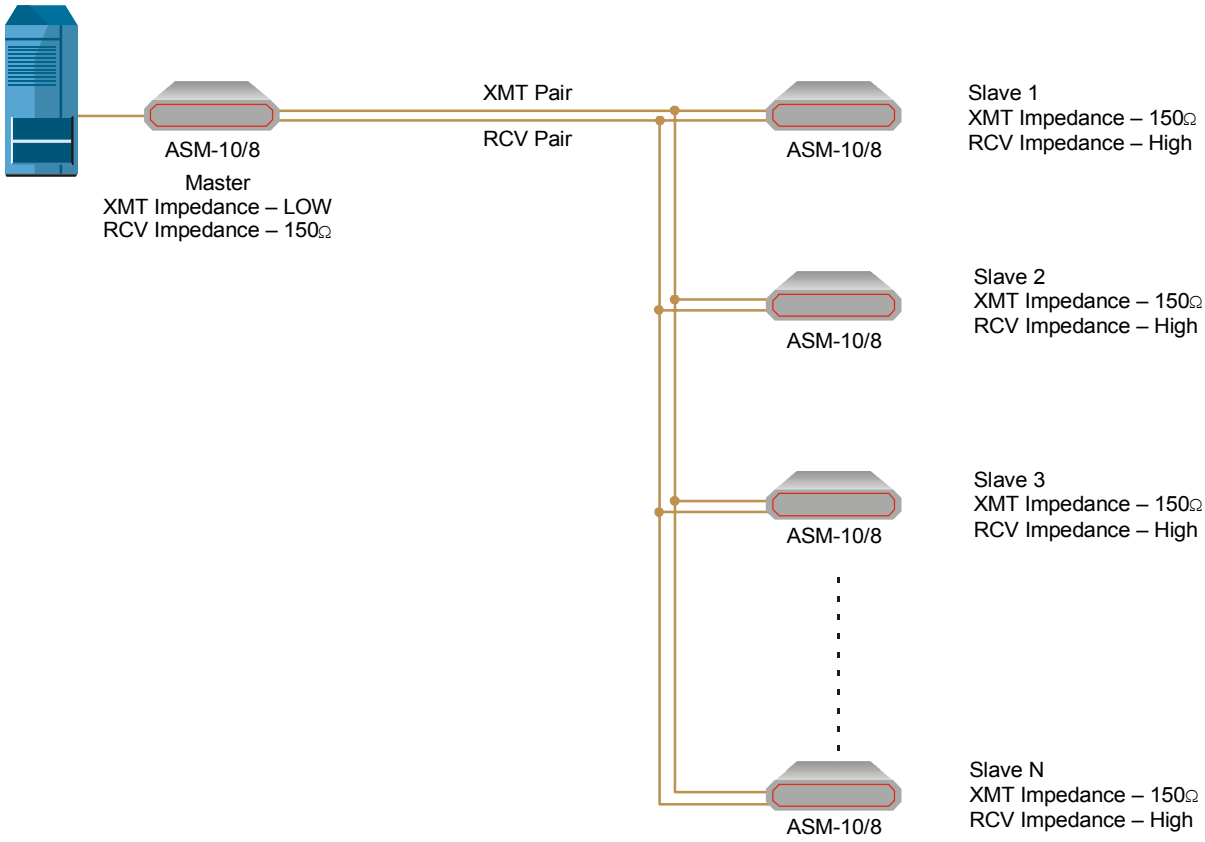


Figure 1-2. Multipoint Application

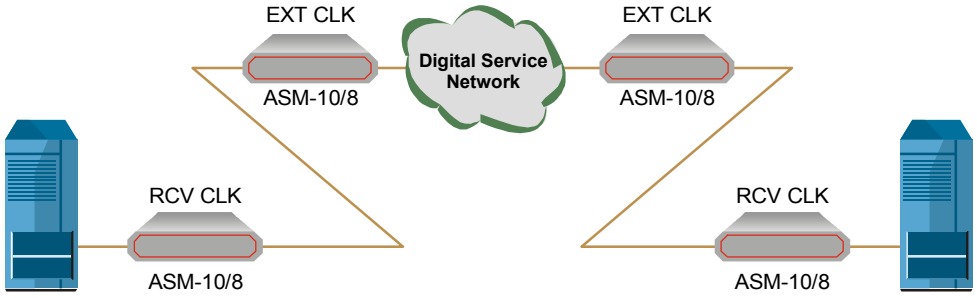


Figure 1-3. Tail-End Application for DDS Service

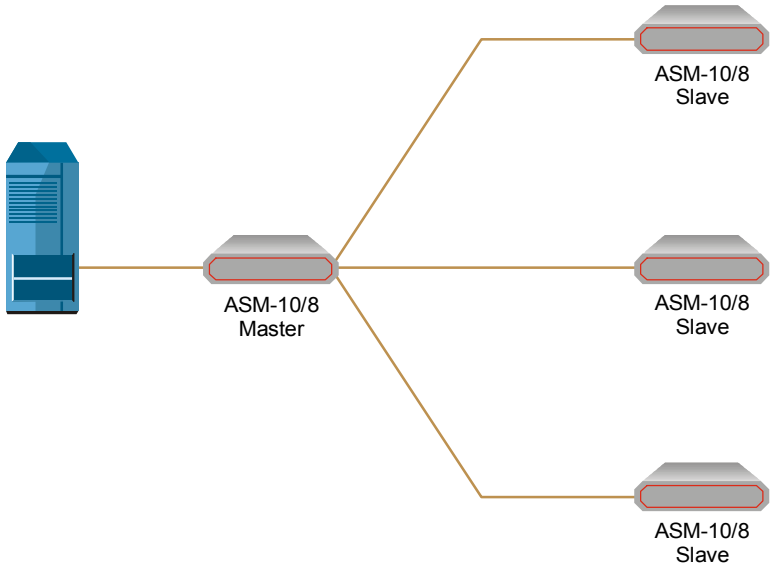


Figure 1-4. Star Application

Note *In the star application, set the XMT and RCV impedance of all the modems to 150Ω.*

Features

The ASM-10/8 modem uses conditioned differential diphase modulation (EUROCOM Std. D1) to provide protection from background noise, eliminate normal line distortion and permit efficient transmission and reception of serial data over twisted pair cable. ASM-10/8 is connected to the telephone line through isolation transformers which, in conjunction with electronic circuitry, protect the device against AC or DC voltage fluctuations. The protection circuitry permits operation of ASM-10/8 even when DC is connected to the line.

The modem's transmit level and transmit and receive impedances are independently selectable. The transmit timing is either provided internally, or it is derived externally from the data terminal or regenerated from the receive signal. The modem's receive timing is regenerated from the receive signal.

ASM-10/8 communicates over lines in synchronous mode only. When set to the asynchronous mode, ASM-10/8 performs an asynchronous to synchronous conversion in compliance with ITU V.14 bis standard.

The unit has line protection circuits against lightning and power surges.

ASM-10/8 also operates in conjunction with the MCS-10 dual modem card of the MCS-12 Monitoring and Control System.

The ASM-10/8/R card is capable of sensing and indicating power failure on the remote ASM-10/8 standalone unit. When this feature is enabled, the RPF LED lights in case of a remote power failure.

Transmission Range

Table 1-1 lists the ASM-10/8 approximate transmit ranges over 19 AWG, 24 AWG and 26 AWG wires.

Table 1-1. ASM-10/8 Transmission Ranges

Data Rate	19 AWG (0.9 mm)		24 AWG (0.5 mm)		26 AWG (0.4 mm)	
[kbps]	km	miles	km	miles	km	miles
19.2	22.5	14.0	10.0	6.2	7.5	4.7
14.4	24.5	15.3	11.0	6.9	8.2	5.1
9.6	29.0	18.1	13.0	8.1	9.5	5.9
7.2	33.0	20.5	15.0	9.4	11.0	6.9
4.8	36.0	22.5	16.0	10.0	12.0	7.5
3.6	40.0	25.0	18.0	11.2	13.5	8.4
2.4	47.0	29.3	21.0	13.1	15.7	9.8
1.2	55.0	34.3	28.0	17.5	21.0	13.1

Diagnostics

ASM-10/8 V.54 diagnostic capabilities include:

- Local analog loopback (ANA), activated by the front-panel pushbutton or DTE interface signal, pin 18
- Remote digital loopback (REM), activated by the front-panel pushbutton or DTE interface signal, pin 21
- Local digital loopback (DIG), activated by the front-panel pushbutton.

1.2 Physical Description

ASM-10/8 is available as a standalone desktop unit or as a card for the ASM-MN-214 modem rack. *Figure 1-5* shows the 3D view of the ASM-10/8 standalone unit.

Figure 1-5. ASM-10/8, 3D View

The front panel includes six LEDs, which display the status of power, data flow, control signals and diagnostics. Three front-panel switches control the three loopback modes. For detailed description of the front panel, see *Chapter 3*.

The back panel includes an AC cord connector with fuse, an interface connector, and a terminal block with a ground connection for connecting the telephone lines. The ASM-10/8 rear panel is described in greater detail, in *Chapter 2*.

The internal switches and jumpers can be configured to support a variety of modes for operating the modem. Refer to *Chapter 2* for details on jumper location and setting.

1.3 Functional Description

This section contains functional descriptions of the circuit blocks of ASM-10/8, primarily those circuits which are required for setting the desired modem configuration (see *Figure 1-6*).

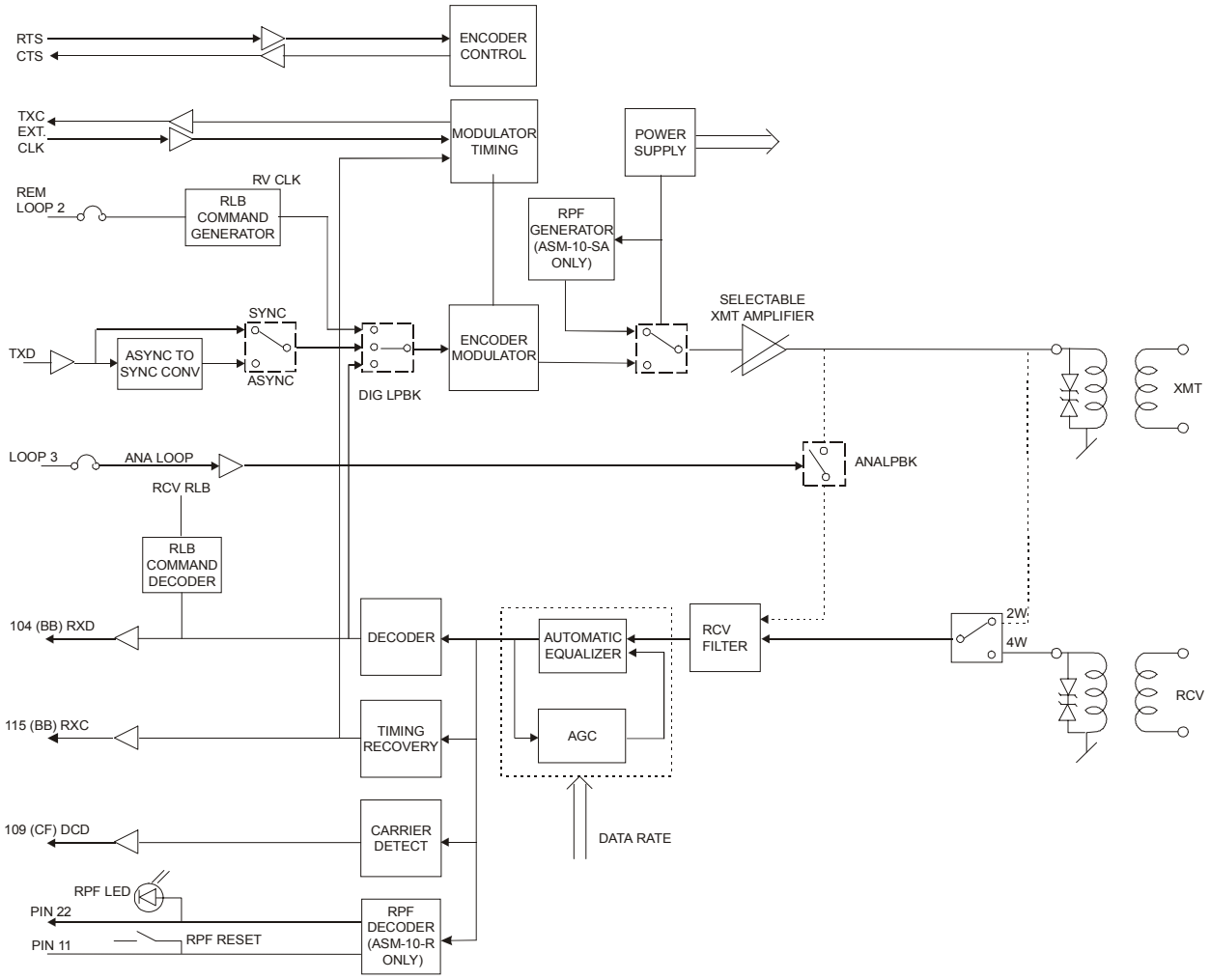


Figure 1-6. ASM-10/8 Block Diagram

Encoder

The encoder modulates the input data from the DTE using the conditional diphase modulation technique.

The encoder can be configured to operate in one of the following different modes:

- 4-wire full duplex
- 4-wire half duplex
- 2-wire half duplex
- 4-wire multipoint
- 2-wire multipoint.

Modulation Timing

This circuit supplies the transmit clock signal to the encoder.

The following clock sources are available:

- INT.CK (internal clock) – from the modem's internal crystal oscillator)
- EXT.CK (external clock) – from DTE, pin 24
- RCV.CK (receive clock) – recovered from the received signal
- ASYNC – asynchronous timing for working with the async to sync converter in asynchronous applications.

Timing options are selected using the XMT TIMING jumpers.

Async to Sync Converter

ASM-10/8 has an internal asynchronous to synchronous converter (used for asynchronous data).

Asynchronous transmission is provided by internal conversion from asynchronous to synchronous mode in compliance with ITU V.22 bis. In this standard, the modem compensates for frequency deviation between the modem and the DTE by adjusting the length of the stop bit of the async character. If the modem's frequency is higher than the DTE, the local converter extends the stop bit. If the modem's frequency is lower than the DTE, the local converter deletes one stop bit in every four (25%) or eight (12.5%) characters. The remote converter will add a shorter stop bit (shorter by 12.5% or 25%) before sending the data to the remote DTE.

Shortening the stop bits by 12.5% is suitable for frequency deviations up to 1.1% and shortening the stop bits by 25% is suitable for frequency deviations up to 2.3%.

XMT Level and XMT Filter (Optional)

Four options are available for the XMT level (signal level): 0, -3, -6, -9 dBm.

An optional output filter for the line is available. This filter complies with Bell 43401 standard and meets British Telecom requirements.

Receiver

The receiver comprises several circuits, as shown in the block diagram (see *Figure 1-6*).

- The receive filter removes all the out-of-band frequencies.
- The automatic equalizer comprises several equalizers which are activated according to baud rate.
- The digital AGC automatically compensates for the attenuation of the line.

Remote Power Failure (RPF) Indication

The Remote Power Failure feature notifies the user at a central location of a power failure in a remote modem.

The remote power failure feature can be configured only when the ASM-10/8 standalone unit (remote) operates in conjunction with the rack-mounted card ASM-10/8/R (central). When a power failure occurs, ASM-10/8 standalone unit transmits a special tone, which is detected by ASM-10/8/R and causes the RPF LED to turn on. A special pushbutton – RPF – located on the front panel of ASM-10/8/R, allows the user to reset the RPF LED. The RPF jumper in the standalone unit enables or disables the feature. RPF should be disabled for multipoint applications.

V.54 Diagnostics

ASM-10/8 features V.54 diagnostic capabilities for performing local analog loopback and local and remote digital loopback. When the modem is set to the digital loopback mode, the operator at either end of the line can test both modems and the line. The loopback is controlled either with front-panel pushbuttons or via pin 18 and pin 21 of the V.24/RS-232 interface.

1.4 Technical Specifications

Line Interface	*Type*	Unloaded twisted pair 19 to 26 AWG; 2-wire for half duplex, 4-wire for full duplex
	Connector	5-screw terminal block
	Range	See *Table 1-1*
	Level	0 dBm, -3 dBm, -6 dBm, -9 dBm
	Transmit Impedance	User-selectable: 150, 300, 600Ω, LOW
	Receive Impedance	User-selectable: 150, 300, 600Ω, HIGH
	Return Loss	Greater than 15 dB
	Carrier	Controlled by RTS or constantly ON
	Modulation	Differential diphase (Eurocom Std. D1)
DTE Interface	*Type*	V.24 (RS-232)
	Baud Rate (Sync and Async)	User-selectable: 1.2, 2.4, 3.6, 4.8, 7.2, 9.6, 14.4, 19.2 kbps
	RTS/CTS Delay	User-selectable to: 0, 8 or 64 msec
	Connector	DB-25, female
Diagnostics	*Loopbacks*	• Local (ANA), activated by a pushbutton or by the DTE interface signal, pin 18. • Remote (REM), activated by a pushbutton or by the DTE interface signal, pin 21 • Local (DIG), activated by a pushbutton
Timing	*Receive Clock*	Derived from CDP receive signal
	Transmit Clock	Derived from the following alternative sources: • Internal • External from the terminal, via pin 24 • Loop clock derived from the receive signal looped back as a transmit clock
Indicators	*TD (yellow)*	Transmit Data
	RD (yellow)	Receive Data
	RTS (yellow)	Request to Send
	DCD (yellow)	Data Carrier Detect
	TEST (red)	Test
	PWR (green)	Power
	RPF (red)	Remote Power Fail (ASM-10/8/R only)

Physical	**ASM-10/8**	
	Height	43 mm / 1.7 in
	Width	215 mm / 8.5 in
	Depth	243 mm / 9.5 in
	Weight	956g / 2.1 lb
	ASM-10/8/R	Fits one slot of the ASM-MN-214 modem rack
Power	*AC*	115 or 230 VAC (±10%), 47 to 63 Hz
	DC	18 to 60 VDC
	Power Consumption	3W
	Fuses	0.25A/250V (115 VAC)
		0.125A/250V (230 VAC)
	Protection	AC/DC overvoltage protection circuits are connected via transformers to transmit and receive lines
Environment	*Temperature*	0–50°C / 32–122°F
	Humidity	0 to 90%, non-condensing

Chapter 2

Installation and Setup

This chapter describes installation and setup procedures for the standalone ASM-10/8 modem.

ASM-10/8 is delivered completely assembled. It is designed for tabletop or 19-inch rack installation. For instructions on installation of a single unit or two units in a 19-inch rack, refer to the Rack Mounting Kit for 19-inch Racks guide that comes with the RM kit.

After installing the unit, refer to *Chapter 3* to assure normal operation.

In case a problem encountered, refer to *Chapter 4* for test and diagnostic instructions.

Warning

Internal settings, adjustment, maintenance, and repairs may be performed only by a skilled technician who is aware of the hazards involved.

Always observe standard safety precautions during installation, operation, and maintenance of this product.

2.1 Site Requirements and Prerequisites

An AC-powered ASM-10/8 should be installed within 1.5m (5 ft) of an easily accessible grounded AC outlet. The outlet should furnish 115 VAC or 230 VAC (depending on rated voltage of unit).

A DC-powered ASM-10/8 unit requires DC power supply capable of furnishing 18–60 VDC. In order to prevent a fire hazard, a suitable fuse should be installed in the DC line.

Allow at least 90 cm (36 in) of frontal clearance for operating and maintenance accessibility. Allow at least 10 cm (4 in) clearance at the rear of the unit for signal lines and interface cables.

The ambient operating temperature of ASM-10/8 is 0 to 50°C (32 to 122°F) at relative humidity of 90%, non-condensing.

2.2 Package Contents

The ASM-10/8 package includes the following items:

- One ASM-10/8 unit
- Last Mile Access and Intelligent Modems CD
- AC power cord or DC power supply connector kit
- RM-17 rack mount kit (if ordered).

2.3 Installation and Setup

ASM-10/8 is a standalone device intended for tabletop or bench installation. It is delivered completely assembled. No provisions are made for bolting the ASM-10/8 to the tabletop.

➤ **To install ASM-10/8:**

1. Determine the required configuration of the modem according to your application, and set the internal jumpers and switches accordingly (see *Figure 2-1* and *Table 2-1*).
2. Connect the line (see *Connecting the Line* below).
3. Connect the DTE interface (see *Connecting the DTE* below).
4. Connect power to the unit (see *Connecting the Power* below).

Setting the Internal Jumpers

This section provides information on the functions of the internal jumpers and switches, to help you in the selection of the correct settings for particular application, and gives you step-by-step instructions for performing the internal settings. The default settings are also listed.

➤ **To set the ASM-10/8 internal jumpers:**

1. Open the ASM-10/8 case.
2. Set the ASM-10/8 internal jumpers and switches, referring to *Table 2-1*.
3. Reinstall the ASM-10/8 cover.

Warning

Access to the inside of the equipment is permitted only to the authorized and qualified personnel.

To avoid accidental electric shock, always disconnect the interface cables and the power cord before removing the unit from its casing.

Line voltages are present inside ASM-10/8 when it is connected to power and/or the lines. Moreover, under certain fault conditions, dangerous voltages may appear on the lines connected to the unit.

Any adjustment, maintenance and repair of the opened instrument under voltage must be avoided as much as possible and, when inevitable, should be carried out only by a skilled technician who is aware of the hazard involved. Capacitors inside the unit may still be charged even after the unit has been disconnected from its source of power.

Caution ASM-10/8 contains components sensitive to electrostatic discharge (ESD). To prevent ESD damage, avoid touching the internal components, and before moving jumpers, touch the ASM-10/8 frame.

Opening the ASM-10/8 Case

To reach the internal jumpers and switches of ASM-10/8, it is necessary to open its case.

➤ **To open the ASM-10/8 case:**

1. Disconnect all the cables connected to ASM-10/8.
2. Turn the unit over (bottom facing up).
3. Unscrew the four cover screws.
4. Turn the unit over (bottom facing down).
5. After the four screws released, remove the ASM-10/8 top cover by pulling it straight up.

Setting the Internal Jumpers and Switches

The internal jumpers and switches located on the ASM-10/8 printed circuit board (PCB) are identified in *Figure 2-1*. Their numbers under heading "Item" in *Table 2-1* correspond to the identification numbers shown in *Figure 2-1*.

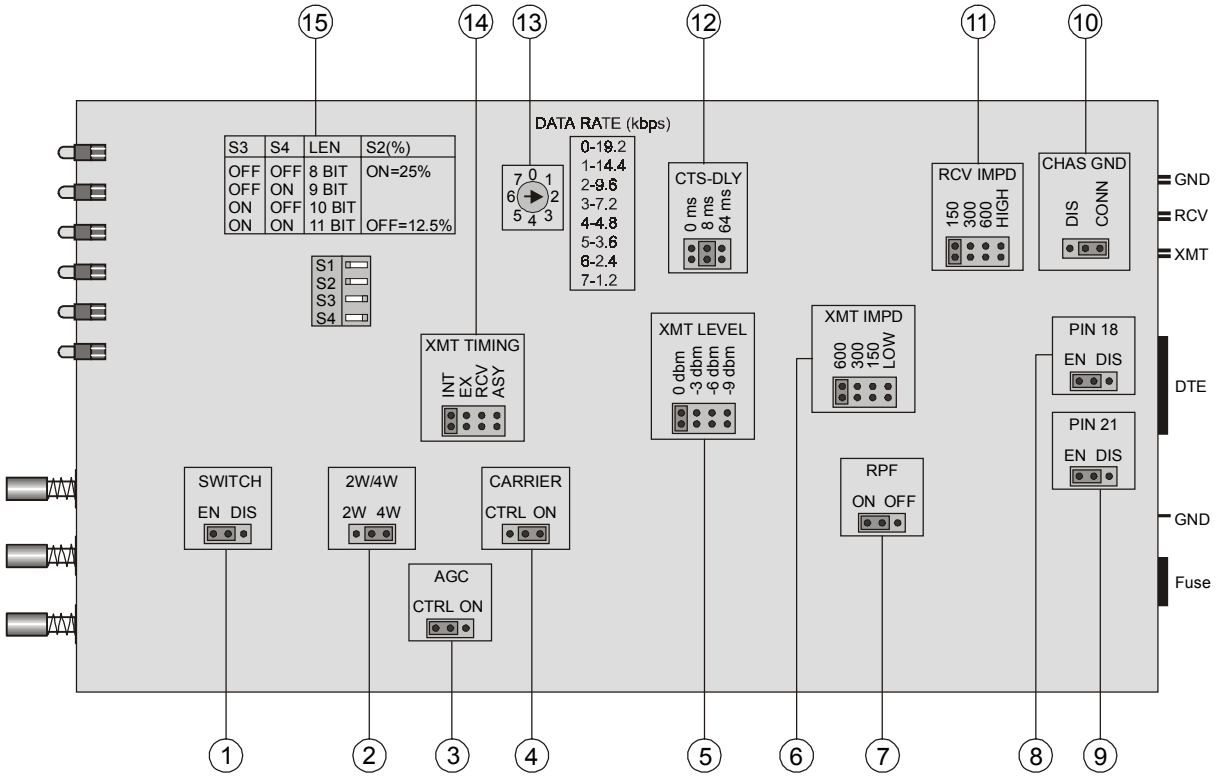


Figure 2-1. ASM-10/8 PCB Layout

Table 2-1. ASM-10/8 Internal Jumpers and Switches

Item	Jumper	Description	Values	Default Setting
1	SWITCH	Enables activation of DIG, ANA and REM loopbacks via the front-panel pushbuttons	**EN** – The loopbacks can be activated via the front panel **DIS** – The loopbacks cannot be activated via the front panel	EN
2	2W/4W	Selects 4-wire or 2-wire operation	**4W** – 4-wire operation **2W** – 2-wire operation	4W
***Note**: When using 2-wire operation, connect both wires to the XMT screws of the terminal.*				
3	AGC	Controls the AGC operation Refer to *Configuration Considerations* below for detailed explanation of the AGC settings.	**ON** – AGC is always active **CTRL** – ACG is active only when DCD turns on	ON
***Note**: When set to CTRL, ACG remains at its last level of amplification if DCD goes off.*				
4	CARRIER	Selects the transmit carrier mode.	**ON** – Transmit carrier is constantly On **CTRL** – Transmit carrier is On only if RTS is high	ON
***Note**: Set CARRIER to CTRL when using ASM-10/8 in multipoint applications.*				
5	XMT LEVEL	Selects the transmit output level to the line	**0 dbm** **-3 dbm** **-6 dbm** **-9 dbm**	0 dbm
6	XMT IMPD	Selects transmit line impedance	**600** **300** **150** **LOW**	150
***Note**: Set XMT IMPD to LOW when using ASM-10/8 in multipoint applications.*				
7	RPF	Enables the Remote Power Failure notification (ASM-10/8/R only)	**ON** – RPF notification enabled **OFF** – RPF notification disabled	ON
***Note**: Set RPF to OFF when using ASM-10/8 in multipoint applications.*				
8	PIN 18	Controls the local analog loopback activation via the DTE pin 18	**EN** – The analog loopback activation from the DTE enabled **DIS** – The analog loopback activation from the DTE disabled	EN

Table 2-1. ASM-10/8 Internal Jumpers and Switches (Cont.)

Item	Jumper	Description	Values	Default Setting
9	PIN 21	Controls the remote digital loopback activation via the DTE pin 21	**EN** – The remote loopback activation from the DTE enabled **DIS** – The remote loopback activation from the DTE disabled	EN
10	CHAS GND	Controls the connection between the ASM-10/8 signal ground and the frame (chassis) ground	**CONN** – Signal ground is connected to the frame ground **DIS** – Signal ground is disconnected from the frame ground	CONN
***Note**: Disconnecting the signal ground from the frame ground may render the unit unsafe for connection to unprotected telecommunication networks in some locations.*				
11	RCV IMPD	Selects receive line impedance	**150** **300** **600** **HIGH**	150
***Note**: Set RCV IMPD to 150Ω for the master modem and the last modem in the line, and all others to HIGH, when using ASM-10/8 in multipoint applications.*				
12	CTS-DLY	Selects delay between RTS and CTS Refer to *Configuration Considerations* below for detailed explanation of the CTS delay settings.	**0 msec** **8 msec** **64 msec**	8 msec
13	Data Rate	Selects the data rate	**0 – 19.2** **1 – 14.4** **2 – 9.6** **3 – 7.2** **4 – 4.8** **5 – 3.6** **6 – 2.4** **7 – 1.2**	9.6
14	XMT TIMING	Selects the transmit timing signal clock source	**INT CK** – Internal clock **EXT CK** – External clock **RCV CK** – Receive clock **ASYNC** – Async mode	INT CK

Table 2-1. ASM-10/8 Internal Jumpers and Switches (Cont.)

Item	Jumper	Description	Values			Default Setting
15	DIP Switch	The DIP switch consists of four sections. The S1 section is reserved for future use.				
	S2	Selects the amount of stop bit shortening to be used in async mode.	**ON** – 25% **OFF** – 12.5%			OFF
	S3, S4	Selects character length in async mode Refer to *Configuration Considerations* below for detailed explanation.	**S3**	**S4**	**No of bits**	
			OFF	OFF	8 BIT	
			OFF	ON	9 BIT	
			ON	OFF	10 BIT	10 BIT
			ON	ON	11 BIT	

Configuration Considerations

Setting AGC and CTS Delay

ASM-10/8 receiver consists of the following components:

- Receiver filter, which removes all the out-of-band frequencies.
- Automatic equalizer, which comprises several equalizers activated according to baud rate.
- Digital AGC, which automatically compensates for the attenuation of the line.

The following are general recommendations for the setup position of the AGC and CTS delay:

For point-to-point applications, set AGC to ON and CTS delay to 8 msec.

In multipoint or star applications, the AGC and CTS delay settings depend on the distances between the modems (see *Table 2-2* and *Table 2-3*).

Table 2-2. AGC and CTS Delay Settings for Short-Range Applications

Range	Rate	AGC Setting	CTS Delay Setting
Less than 4.5 km 6 km	9.6 to 19.2 kbps 3.6 to 7.2 kbps	CTRL (master and slave)	0 msec (master)
	4.8 kbps		8 msec (slave)
	2.4 to 4.8 kbps		8 msec or 64 msec (slave)
	2.4 kbps and below		64 msec (slave)

***Note**: The selection between delays depends on the polling environment behavior. Therefore, it is different from application to application*

Table 2-3. AGC and CTS Delay Settings for Long-Range Applications

Range	Rate	AGC Setting	CTS Delay Setting
Long or uneven distances between master and slave modems		ON (master and slave)	0 msec (master)
	Above 9.6 kbps		8 msec (slave)
	Below 9.6 kbps		64 msec (slave)

Setting the Async Character Length

Table 2-4 lists the character length values in the asynchronous mode.

Table 2-4. Async Character Length Settings

Start Bit	Data Bits	Parity	Stop Bit	No of Bits
1	5	None	2	8
1	6	None	1, 1.5, 2	8 9
1	6	Odd, Even	1, 1.5, 2	9 10
1	7	None	1, 1.5, 2	9 10
1	7	Odd, Even	1, 1.5, 2	10 11
1	8	None	1, 1.5, 2	10 11
1	8	Odd, Even	1, 1.5, 2	11

Connecting the Interfaces

Figure 2-2 illustrates the rear panel of a standard ASM-10/8 unit.

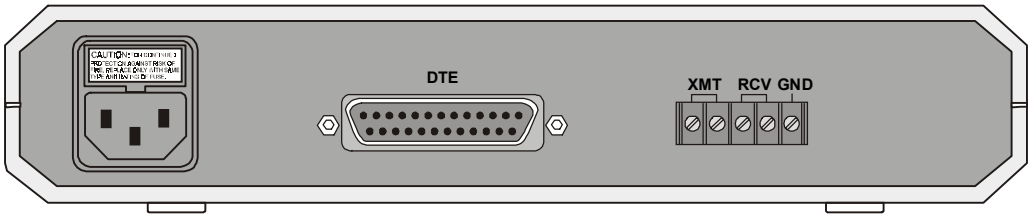


Figure 2-2. ASM-10/8 Rear Panel

Connecting the Line

The line connector is a five-screw terminal block, located on the ASM-10/8 rear panel as shown in *Figure 2-2*. The terminal block provides four screws for connecting the transmit and receive telephone lines and one screw for the ground connection. The transmit and receive pairs are polarity-insensitive.

➤ **To connect the line:**

1. Connect the ground wire to the terminal designated GND (optional).
2. Connect the transmit pair to the terminals marked XMT.
3. Connect the receive pair to the terminals marked RCV.

Note *Use only XMT pair for 2-wire operation.*

Connecting the DTE

The rear-panel DTE connector provides interface for data input/output, clock reference and control signal exchange between ASM-10/8 and the DTE. The DTE connector is V.24/RS-232, D-type 25-pin female connector. Connector pin allocations appear in *Appendix A*.

Connecting the Power

The power is supplied to the ASM-10/8 unit through the 1.5m (5 ft) standard power cable terminated in a standard 3-prong plug. The cable is provided with the unit. DC power connection is described in the *DC Power Supply Supplement* at the end of the manual.

The integral fuse holder, located above the AC socket, contains two fuses (0.125A/250V or 0.25A/250V, slow-blow). The upper fuse is spare and can be used for blown fuse replacement.

Warning

The unit has no power switch. Operation starts when the power is applied to the rear-panel POWER connector.

Before switching on this instrument, the protective earth terminals of this instrument must be connected to the protective ground conductor of the power cord. The power plug shall only be inserted in a power outlet provided with a protective earth contact. The protective action must not be negated by use of an extension cord (power cable) without a protective conductor (grounding).

Make sure that only fuses with the required rated current, as marked on the ASM-10/8 rear panel, are used for replacement. The use of repaired fuses and the short-circuiting of the fuse holders is forbidden.

Whenever it is likely that the protection offered by fuses has been impaired, the instrument must be made inoperative and be secured against any unintended operation.

➤ **To connect power to ASM-10/8:**

1. Connect the power cable to the connector on the ASM-10/8 rear panel.
2. Connect the power cable to the mains outlet.

   The unit turns on automatically upon connection to the mains.

Chapter 3

Operation

This chapter provides the following information for the ASM-10/8 standalone modem:

- ASM-10/8 front-panel indicators and controls
- Operating procedures (turn-on, front-panel indications, performance monitoring and turn-off).

Installation procedures given in *Chapter 2* must be completed and checked before attempting to operate ASM-10/8.

3.1 Front Panel Controls and Indicators

Figure 3-1 shows the ASM-10/8 front panel. *Table 3-1* lists the ASM-10/8 controls and indicators.

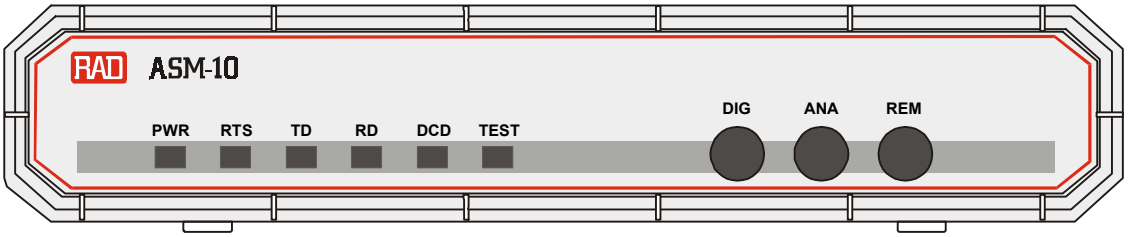


Figure 3-1. ASM-10/8 Front Panel

Table 3-1. ASM-10/8 Front Panel Controls and Indicators

Name	Type	Function
PWR	Green LED	ON – Power is on.
RTS	Yellow LED	ON – The DTE activates Request To Send.
TD	Yellow LED	ON – Steady SPACE is being transmitted. Blinks – Data is transmitted.
RD	Yellow LED	ON – Steady SPACE is being received. Blinks – Data is received.
DCD	Yellow LED	ON – A valid receive signal is present.
TEST	Yellow LED	ON – ASM-10/8 is in any of the three loopback modes, or the PATT pushbutton is pressed.
ERR	Yellow LED	ON or blinks if errors are present in the test pattern.

Table 3-1. ASM-10/8 Front Panel Controls and Indicators (Cont.)

Name	Type	Function
DIG	Pushbutton	The digital loopback pushbutton causes the local ASM-10/8 to loop received data to its transmitter (see *Figure 4-3*).
ANA	Pushbutton	The local loopback (V.54 loop 3) pushbutton causes the local ASM-10/8 to loop its transmitter output back to its receiver (see *Figure 4-1*). This loopback may also be activated from the DTE when the PIN 18 jumper is set to EN.
REM	Pushbutton	The remote digital loopback (V.54 Loop 2) pushbutton causes the remote ASM-10/8 to loop received data to its transmitter (see *Figure 4-2*). This loopback may be also activated from the terminal when the PIN 21 jumper is set to EN.

Note *The PIN 18 and PIN 21 jumpers control the LLB and RLB activation only from the DTE interface. The jumper settings do not affect the ANA and REM pushbutton operation.*

3.2 Operating ASM-10/8

Turning On ASM-10/8

ASM-10/8 is turned on as soon as power is connected. When power is connected, the PWR indicator lights up and remains lit as long as ASM-10/8 receives power.

ASM-10/8 requires no operator attention once installed, with the exception of occasional monitoring of front panel indicators. Intervention is only required when the modem must be configured to new operational requirements, or the diagnostic tests must be performed.

Normal Indications

Table 3-2 shows the correct status of the ASM-10/8 indicators after the local and remote modem are synchronized and data is being transferred.

Table 3-2. ASM-10/8 Indicator Status

Indicator	Status
PWR	ON
RTS	ON
TD	Blinking or OFF
RD	Blinking or OFF
DCD	ON
ERR	OFF
TEST	OFF

If the LEDs do not reflect the above status, ensure that:

- One modem is set to internal or external clock, and the other to receive clock.
- The four front-panel pushbuttons are in the OFF position.

Turning Off ASM-10/8

To turn off the modem, remove the power cord from the power source.

Chapter 4

Diagnostics

This chapter contains procedures for performing system diagnostic tests for ASM-10/8. Use the test procedures provided in this chapter to:

- Verify normal system operation
- Isolate faulty equipment
- Identify other sources of system malfunction.

The tests are activated by control pushbuttons on the ASM-10/8 front panel and monitored via LED indicators. For description of ASM-10/8 controls and indicators and their functionality, see *Chapter 3*.

4.1 V.54 Loopback Tests

ASM-10/8 supports several types of loopback tests for evaluating the operation of the data system equipment and its line circuits. Using these loopbacks, you can test communication between the attached equipment, internal circuitry of the local and remote modems.

Loopback test are best performed in the following order:

1. Local analog loopback
2. Remote digital loopback
3. Local digital loopback.

Before testing the operation of the data system equipment and line circuits, ensure that all the units are powered up and configured properly.

Note *If you want to run the LLB and RLB tests via the DTE interface pins, ensure that the PIN 18 and PIN 21 jumpers are set to EN (see Table 2-1 and Figure 2-1).*

Local Analog Loopback (LLB)

The local analog loopback (LLB) test checks the performance of the local ASM-10/8 modem, the local DTE, and the connections between them (see *Figure 4-1*). The test is performed separately at the local and the remote site.

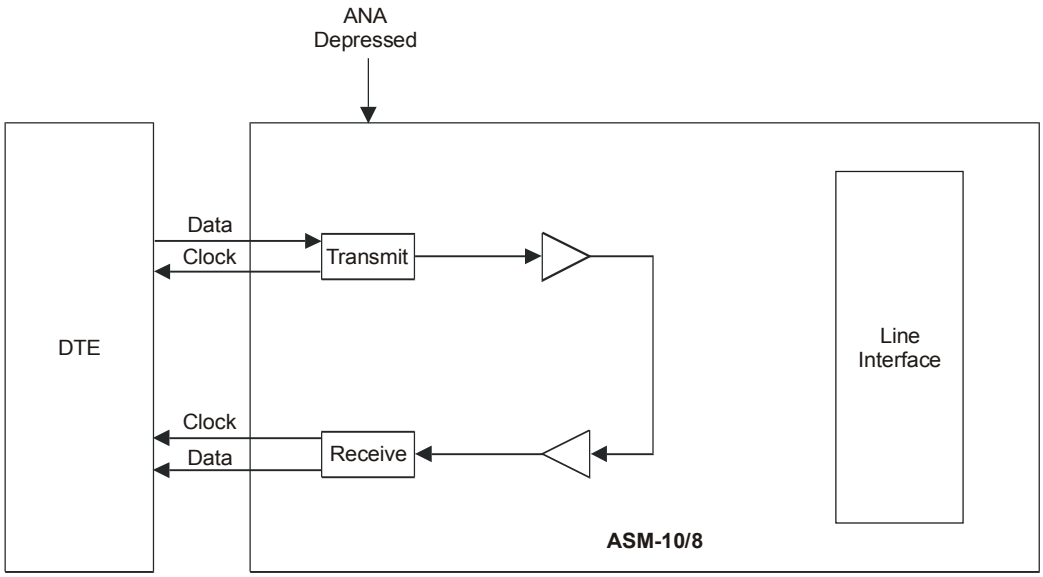


Figure 4-1. Local Analog Loopback

➤ **To perform the local analog loopback test:**

1. Press the ANA pushbutton.

   The TEST LED on the ASM-10/8 front panel lights up. The modem's transmit output is now connected to its own receiver.

2. Execute the local analog loopback with one of the following methods:
   - Using the DTE configured to the half duplex operation and checking the echoed data stream.
   - Using an external BER tester.

     If the BER test indicates an error-free data stream, but the DTE test indicates a fault, verify that the cable between the DTE and ASM-10/8 is properly connected. If the problem persists, follow the DTE manufacturer's test procedures.

3. To isolate a communication line problem, perform the LLB loopback at the opposite end. If both LLB tests are error-free, the fault is probably in the communication line or in the line interfaces.
4. After completing the test or correcting the fault, press ANA pushbutton again to restore it to the Off position.

Remote Digital Loopback (RLB)

The remote digital loopback (RLB) test checks the performance of the local and the remote ASM-10/8 units and their connecting lines. The remote digital loopback sets a loop at the remote ASM-10/8 unit from the DTE coupled to the local unit (see *Figure 4-2*).

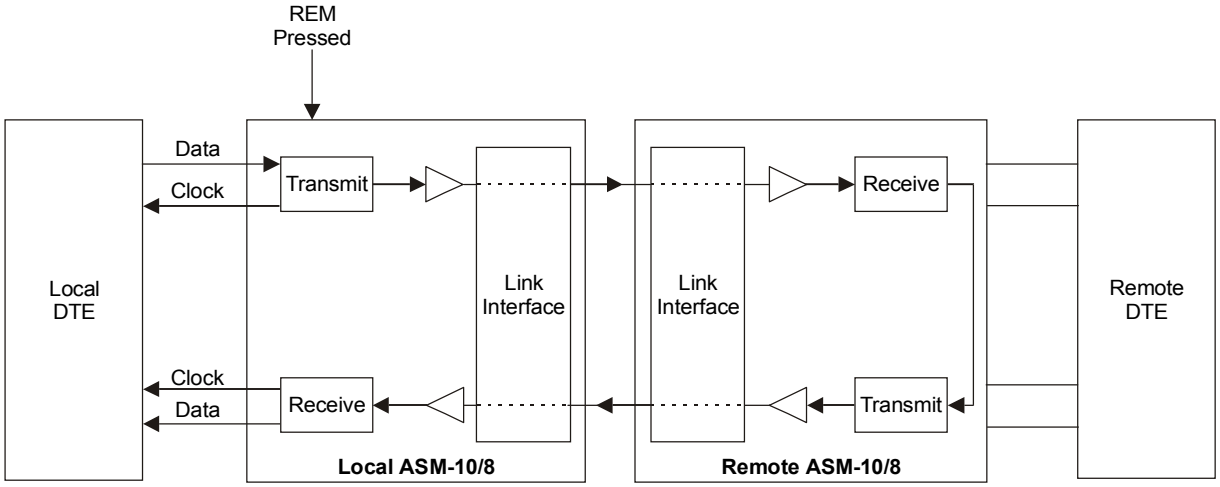


Figure 4-2. Remote Digital Loopback

➤ **To activate the remote digital loopback:**

1. Press the REM pushbutton on the local ASM-10/8 front panel.

   The TEST LED on each ASM-10/8 front panel lights up. The receive output of the remote modem is looped back to the receiver.

2. Perform the BERT test as explained above for the local analog loopback test.

   If an error occurs, while the local analog loopback test described above, was successful for both the local and remote modems, the line or the line circuits of the local or the remote unit are not operating properly.

3. After completing the test or correcting the fault, press REM pushbutton again to restore it to the Off position.

Local Digital Loopback (DIG)

The local digital loopback (DIG) test allows the operator at the remote end to check the performance of the local and remote ASM-10/8 units, and their connecting lines. The DIG test loops the received data back to the remote ASM-10/8 (see *Figure 4-3*). The local digital loopback test is equivalent to activating the remote loopback from the remote ASM-10/8.

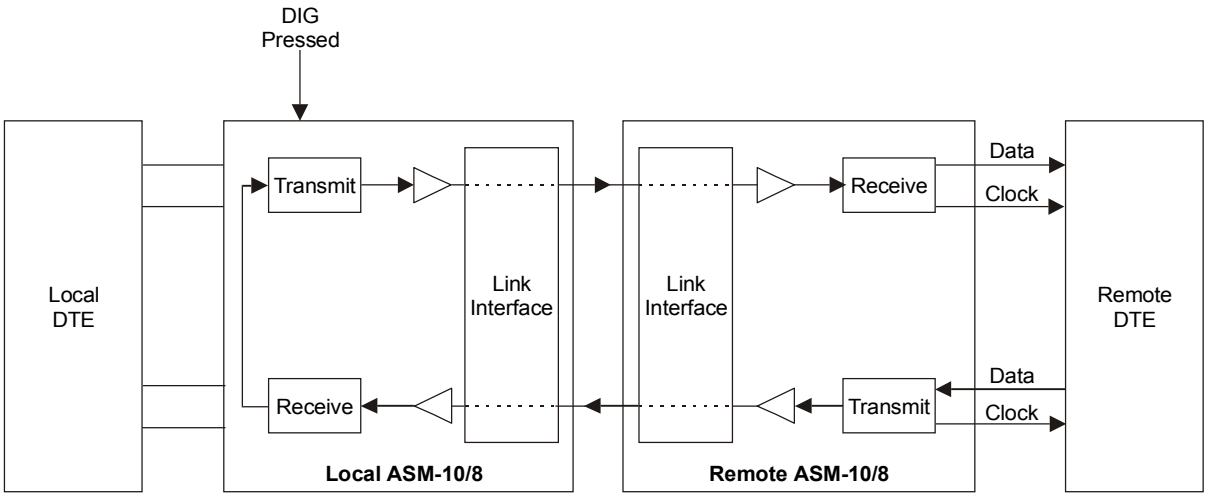


Figure 4-3. Local Digital Loopback

➤ **To activate the local digital loopback:**

- Press the DIG pushbutton on the local ASM-10/8 front panel.

  The TEST LED lights up.

Chapter 5

ASM-10/8/R Card Version

This chapter describes the ASM-10/8/R card, designed for installation in the ASM-MN-214 card cage. The chapter contains the following sections:

- The ASM-MN-214 card cage
- ASM-MN-214 power supply
- The ASM-10/8/R front panel
- Installing the ASM-10/8/R card.

5.1 ASM-MN-214 Card Cage

The ASM-MN-214 card cage contains one or two power supplies and up to 14 plug-in cards. The card types can be ASM-10/8/R or other RAD rack version modems/converters – any combination of up to 14 plug-in cards.

For each of the 14 cards, the rear panel (see *Figure 5-1*) contains a male connector for the terminal block and a DB-25 connector. A protection cover protects the terminal block connectors.

Line Connector

The terminal block (see *Figure 5-1*) is to be attached to the rear panel terminal block connectors. It contains screws for connecting the transmit and receive pairs and ground, if present.

The ASM-MN-214 card cage is also available with BNC coaxial unbalanced line connectors.

DB-25 DTE Connector

The 25-pin D-type female interface connector provides all interface signals for the digital interfaces.

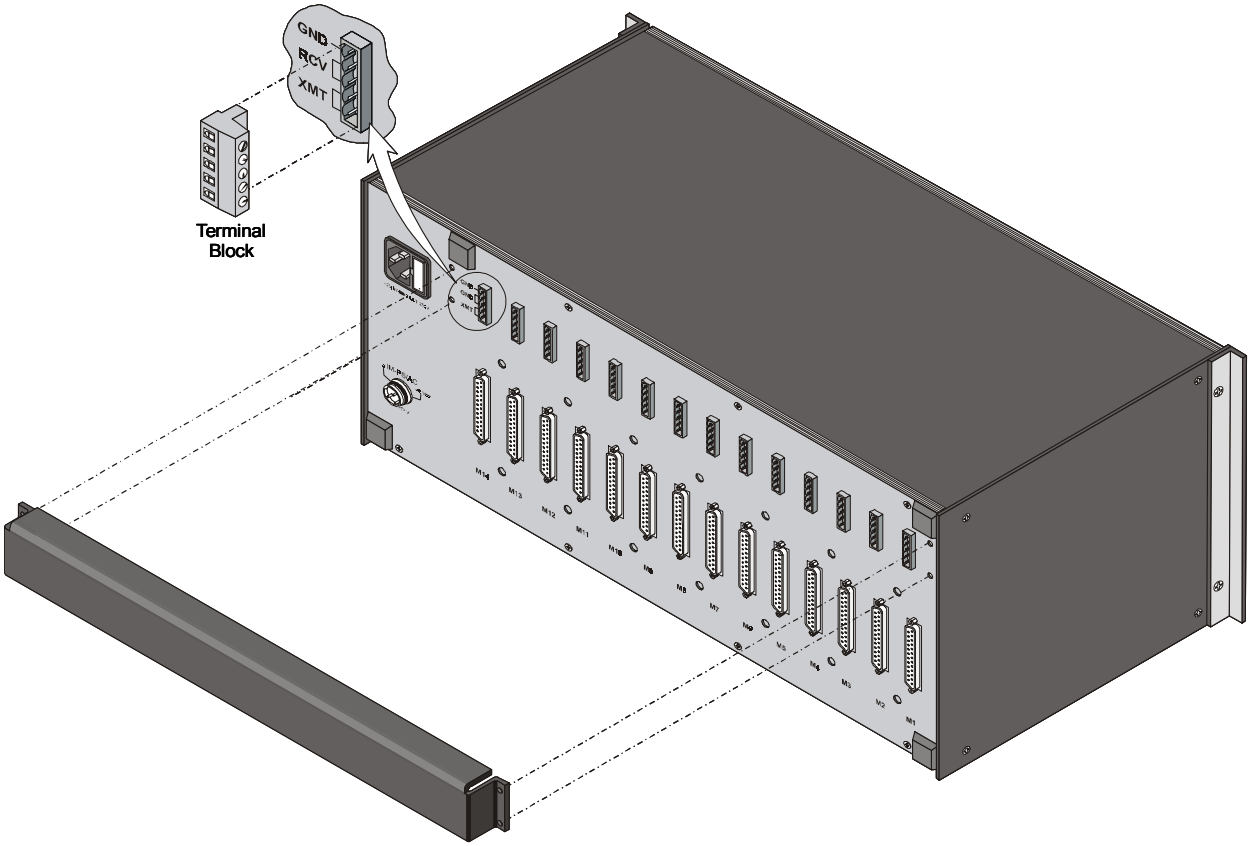


Figure 5-1. ASM-MN-214 Rear Panel

5.2 Power Supply

Power is supplied to the ASM-10/8/R card from the ASM-MN-214 power supply via the chassis. Each ASM-10/8/R card has two fuses, which protect the entire system against power failure resulting from a short circuit in one card.

The ASM-MN-214 card cage can accept both AC or DC power supplies. LED indicators located on the ASM-MN-214 front panel (see *Figure 5-3*) show activity when the power supply is connected to the mains plug. The power supply supports the full card cage with any combination of cards.

AC Supply

The AC power supply of the ASM-MN-214 is 100, 115, or 230 VAC, ±10%, 47 to 63 Hz.

DC Supply

The DC power supply is -48 VDC (-36 to -72 VDC) or 24 VDC (18 to 32 VDC). It uses a DC/DC converter module to provide the power required for the cards.

Power Supply with Redundancy

This special ordering option is equipped with two separate power supplies, operating together and sharing the load of the whole card cage. If either of the power supplies fails, the other one will continue to supply power to the full card cage.

Two LED indicators show activity of each power supply. They should both light when mains power is provided.

Note *It is possible to combine AC and DC power supplies in the same cage.*

5.3 ASM-10/8/R Front Panel

Figure 5-2 shows the ASM-10/8/R card front panel. The LEDs and pushbuttons of the card version are identical in their functionality to those of the standalone device. For this information, refer to *Chapter 3*.
The ASM-10/8/R front panel features one additional LED indicator (RPF) and one additional pushbutton (RPF). The RPF (Remote Power Failure) LED turns on when a power failure occurs in the remote standalone ASM-10/8 unit. The RPF pushbutton resets the RPF LED after the power failure.

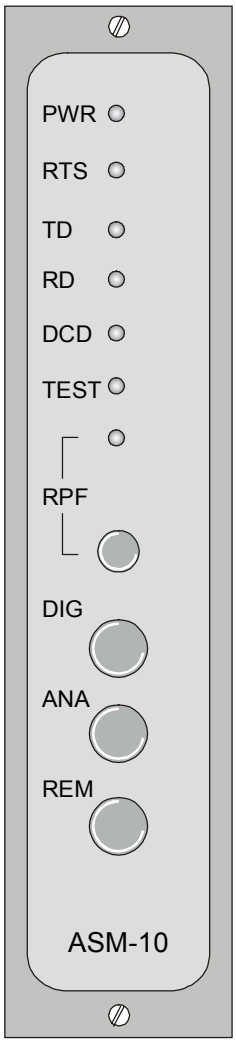


Figure 5-2. ASM-10/8/R Front Panel

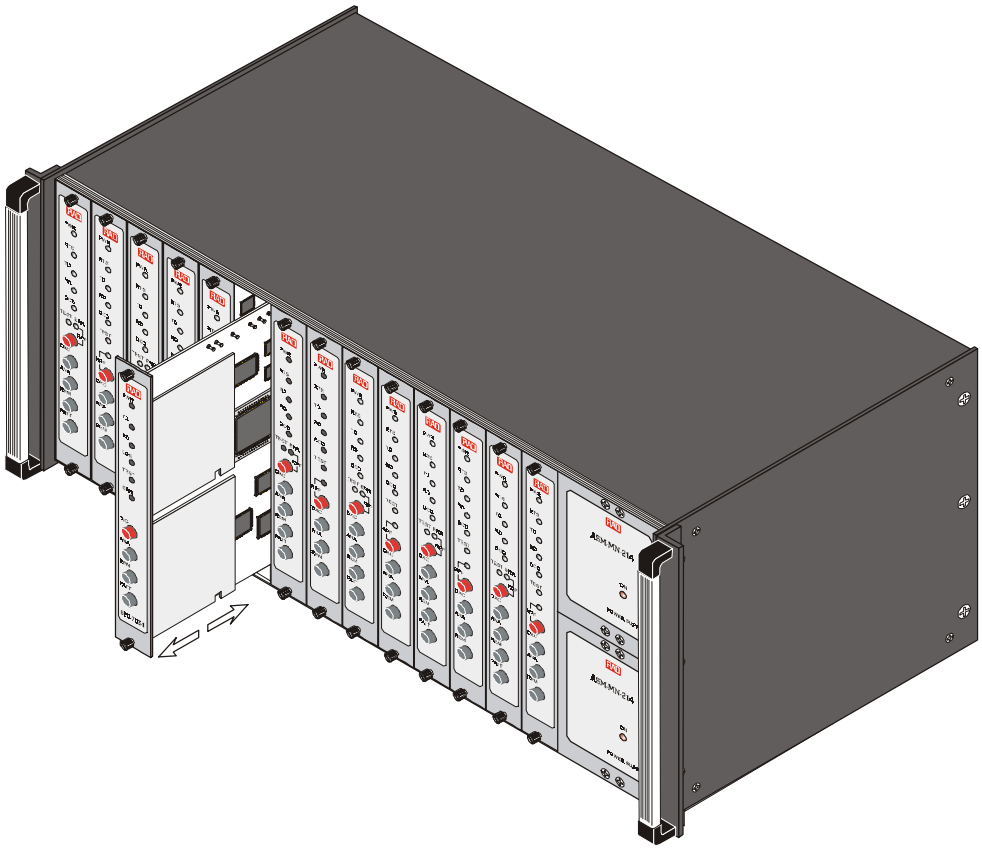


Figure 5-3. ASM-MN-214 Front Panel

5.4 Installing the ASM-10/8/R Card

Setting Internal Jumpers and Switches

The ASM-10/8/R internal jumpers and switches are similar in their functionality to those of the standalone unit. For the details on the internal settings, refer to *Figure 2-1* and *Table 2-1*.

Installing ASM-10/8/R into the ASM-MN-214 Card Cage

➤ **To install the ASM-10/8/R card in the ASM-MN-214 card cage:**

1. Install the ASM-MN-214 card cage in the 19-inch rack.
2. Insert the ASM-10/8/R card into one of the ASM-MN-214 slots.
3. Push the card into the cage until it is fully inserted into the edge connector inside the rack.
4. Tighten the screws on front panel of the modem card.

Connecting the Interfaces

ASM-10/8/R uses the ASM-MN-214 rear panel terminal block ports for the line connections. The 25-pin D-type female connector serves as a DTE port.

1. Remove the protection cover from the terminal block connectors.
2. Connect the terminal block to the ASM-MN-214 terminal block connector.
3. Connect the line to the terminal block as follows: connect transmit pair to the terminals marked XMT, the receive pair to the terminals marked RCV, and the fifth screw to ground (optional).
4. Connect the DTE cable to the DB-25 connector.
5. Connect power to the ASM-MN-214 card cage:
   - To connect AC power, connect the power cable to the mains supply.
   - To connect DC power, refer to *DC Power Supply Connection Supplement* of the ASM-MN-214 Installation and Operation manual.

Warning

The ASM-MN-214 card cage has no power switch. Operation starts when the power is applied to the rear panel POWER connector. When applying power, first connect the plug of the power cord to the ASM-MN-214 POWER connector and then to the mains power source (outlet).

Appendix A
Connector Wiring

A.1 DTE Interface Pin Assignment

The V.24/RS-232 DTE interface of ASM-10/8 terminates in DB-25 female connector, wired in accordance with *Table A-1*.

Table A-1. V.24/RS-232 Connector Pinout

V.24	RS-232	DTE Pin	Signal Identity	Description
101	AA	1	Protective Ground	Chassis ground. May be isolated from Signal Ground (refer to the CHAS GND jumper description in *Table 2-1*).
102	AB	7	Signal Ground	Common signal and DC power supply ground.
N/A	N/A	9 10	+8 volts –8 volts	Output +8 VDC Output –8 VDC
103	BA	2	Transmitted Data	Serial digital data from a terminal or other source. If accompanied by an external data rate clock data, transitions must occur on positive-going transitions of the external transmit output clock.
104	BB	3	Received Data	Serial digital data at the output of the modem receiver. The data transitions occur at the rising edge of the clock.
105	CA	4	Request to Send	A positive level to ASM-10/8 when data transmission is desired.
106	CB	5	Clear to Send	A positive level from ASM-10/8 with selectable delay, after receipt of Request to Send and when ASM-10/8 is ready to transmit.
107	CC	6	Data Set Ready	A positive level from ASM-10/8, power is on and ASM-10/8 is not in the Local Digital Loopback mode or has not received a Remote Digital Loopback signal from the remote unit.
109	CF	8	Receive Line Signal Detector (Carrier Detect)	A positive level from ASM-10/8, except when a loss of the received input is detected or when Data Set Ready is negative.
113	DA	24	External Trans. Serial Clock	A serial data rate clock input from the data source. Positive clock transitions correspond to data transitions.
114	DB	15	Transmitter Signal Element Timing	A transmit data rate clock for use by external data source. Positive clock transitions correspond to data transitions.

Table A-1. V.24/RS-232 Connector Pinout (Cont.)

V.24	RS-232	DTE Pin	Signal Identity	Description
115	DD	17	Receiver Signal	A receive data rate clock output for use by external data sink. Positive clock transitions correspond to data transitions.
142		25	Test Indicator	A positive control signal output from ASM-10/8 during any test mode.
141		18	Loop 3 Test Command	A control signal input; when on, commands ASM-10/8 into Local Analog Loopback (V.54 Loop 3).
140		21	Loop 2 Test Command	A control signal input; when on, commands ASM-10/8 to send a Remote Digital Loopback command (V.54 Loop 2) to the remote ASM-10/8.
		11	RPF LED Reset	A positive level to the ASM-10/8/R (from management system) resets the RPF LED in ASM-10/8/R.
		22	Remote Power Failure	A positive level from ASM-10/8/R when remote power failure occurs.

RAD

SUPPLEMENT

DC Power Supply Connection – Terminal Block Connector

Note: Ignore this supplement if the unit is AC-powered.

Certain DC-powered units are equipped with a plastic 3-pin *VDC-IN* power input connector, located on the unit rear panel. Supplied with such a unit, is a mating Terminal Block (TB) type connector plug for attaching to your power supply cable.

Connect the wires of your power supply cable to the TB plug, according to the voltage polarity and assembly instructions provided below.

Caution: *Prepare all connections to the TB plug* ***before*** *inserting it into the unit's VDC-IN connector.*

Preparing and Connecting the TB Plug

Refer to Figure 1 for assistance.

1. Strip the insulation of your power supply wires according to the dimensions shown.
2. Place each wire lead into the appropriate TB plug terminal according to the voltage polarity mapping shown in *Figure 2.* (If a terminal is not already open, loosen its screw). Afterwards, tighten close the three terminal screws.
3. Pull a nylon cable tie (supplied) around the power supply cable to secure it firmly to the TB plug grip (pass the tie through the holes on the grip).

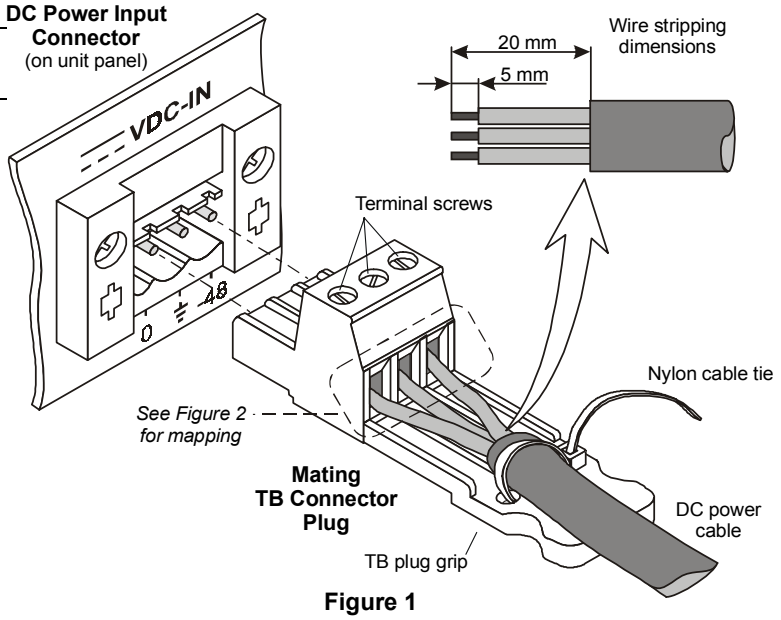


Figure 1

4. Isolate the exposed terminal screws/wire leads using a plastic sleeve or insulating tape, to prevent the possibility of short-circuit.
5. Connect the assembled power supply cable to the unit by inserting the TB plug into the unit's *VDC-IN* connector until it snaps into place.

DC Power Supply Wire Voltage Polarity

Refer to *Figure 2* for proper mapping of the power supply wire leads to the TB plug's three terminals.

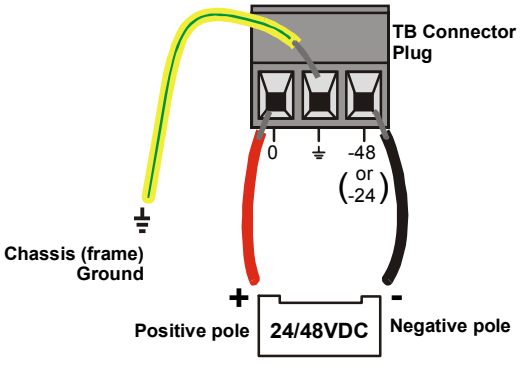


Figure 2

> ***Warning:***
> - *Reversing the wire voltage polarity can cause damage to the unit!*
> - *Always connect a ground (earth) wire to the TB plug's Chassis (frame) Ground terminal. Connecting the unit without a protective ground, or interruption of the grounding (for example, by using an extension power cord without a grounding conductor) can cause harm to the unit or to the equipment connected to it!*

RAD
data communications

24 Raoul Wallenberg St., Tel Aviv 69719, Israel
Tel: +972-3-6458181, Fax: +972-3-6483331, +972-3-6498250
E-mail: erika_y@rad.co.il, Web site: http://www.rad.com

Customer Response Form

RAD Data Communications would like your help in improving its product documentation. Please complete and return this form by mail or by fax or send us an e-mail with your comments.

Thank you for your assistance!

Manual Name: ASM-10/8

Publication Number: 600-200-08/02

Please grade the manual according to the following factors:

	Excellent	*Good*	*Fair*	*Poor*	*Very Poor*
Installation instructions	❒	❒	❒	❒	❒
Operating instructions	❒	❒	❒	❒	❒
Manual organization	❒	❒	❒	❒	❒
Illustrations	❒	❒	❒	❒	❒
The manual as a whole	❒	❒	❒	❒	❒

What did you like about the manual?

_____

_____

_____

_____

_____

Error Report

Type of Error(s) or Problem(s):

- ❒ Incompatibility with product
- ❒ Difficulty in understanding text
- ❒ Regulatory information (Safety, Compliance, Warnings, etc.)
- ❒ Difficulty in finding needed information
- ❒ Missing information
- ❒ Illogical flow of information
- ❒ Style (spelling, grammar, references, etc.)
- ❒ Appearance
- ❒ Other _____

Please list the exact page numbers with the error(s), detail the errors you found (information missing, unclear or inadequately explained, etc.) and attach the page to your fax, if necessary.

_____

_____

_____

_____

Please add any comments or suggestions you may have.

_____

_____

_____

You are:

- ❒ Distributor
- ❒ End user
- ❒ VAR
- ❒ Other _____

Who is your distributor? _____

Your name and company: _____

Job title: _____

Address: _____

Direct telephone number and extension: _____

Fax number: _____

E-mail: _____

data communications

www.rad.com

INTERNATIONAL HEADQUARTERS:

24 Raoul Wallenberg Street, Tel Aviv 69719, Israel, Tel: 972-3-6458181
Fax: 972-3-6498250, 972-3-6474436, Email: rad@rad.co.il

U.S. HEADQUARTERS:

900 Corporate Drive, Mahwah, N.J. 07430, Tel: (201) 529-1100
Toll Free: 1-800-444-7234, Fax: (201) 529-5777, Email: market@radusa.com

Publication No. 600-200-08/02